A Comparison of Single and Multiple Habitat Rapid Bioassessment Sampling Methods for Macroinvertebrates in Piedmont and Northern Piedmont Streams

Karen A. Blocksom[1], Joseph E. Flotemersch[1], Brad Autrey[1], Margaret Passmore[2]

[1]U.S. EPA, EERD, NERL, Mail Code 642, 26 W. Martin Luther King Dr, Cincinnati, OH 45268
[2]U.S. EPA, Region 3, 1060 Chapline Street, Suite 303, Wheeling, WV 26003

Biographical Sketches of Authors

Karen Blocksom is a statistician in the Ecological Exposure Research Division (EERD) of the U.S. Environmental Protection Agency's National Exposure Research Laboratory (NERL) with training in both statistics and aquatic ecology. She has been involved with development and statistical evaluation of biological indicators, including multimetric indices, for the past six years. Karen also has been involved extensively with analysis of data from a study comparing large river methods for fish, macroinvertebrates, and algae, as well as the development of a new method for sampling macroinvertebrates in large rivers.

Joseph Flotemersch is an ecologist in the EERD of the U.S. Environmental Protection Agency's NERL with training in aquatic biology, fisheries, wildlife biology, and forest science. His primary area of interest is in large river ecology and assessment, but he is also interested in floodplain river ecology, and the comparison of field sampling methods. He is principal investigator on a study to compare large river sampling methods and a study to develop a new macroinvertebrate sampling method.

Brad Autrey is a biologist in the EERD of the U.S. Environmental Protection Agency's NERL with training in forest and aquatic ecology. He has been an integral part of studies on remote sensing in great rivers, methods comparison and development in large rivers, and methods comparison in wadeable streams. He has been involved in stressor identification studies and is key in maintaining quality assurance standards for the EERD.

Margaret Passmore is an environmental scientist in the Region 3 Wheeling Operations Office of the U.S. EPA with training in environmental chemistry and aquatic ecology. She has been involved with important regional issues, including assessment of the biological effects of mountaintop mining/valley fill coal mining, development of state aquatic reference conditions and indices of biotic integrity, and research on stream assessment methods for the past 12 years. She is also the biocriteria program lead for USEPA Region 3.

Abstract

Stream macroinvertebrate collection methods described in the Rapid Bioassessment Protocols (RBPs) have been used widely throughout the United States. The first edition of the RBP manual in 1989 described a single habitat approach that focused on riffles and runs, where macroinvertebrate diversity and abundance is high. This approach was adopted by many states, tribes, and regions. Many scientists interpreted the revised RBP protocol published in 1999 as a recommendation for multiple habitat sampling. However, no direct comparison of the two RBP protocols was presented in the second edition, and there were no recommendations for reconciling baseline data collected using the single habitat method with data collected using the multiple habitat method. As a result, scientists have been reluctant to switch from the single habitat approach, regardless of the merits that may exist in adopting the multiple habitat approach. In this study, both the single and multiple habitat methods were performed at each of 41 sites in the Piedmont and Northern Piedmont ecoregions. Differences between methods in collected macroinvertebrate assemblages were examined using both a family-level multimetric index for Virginia and a species-level index developed for the mid-Atlantic region. Though few statistically significant differences existed between methods, the relationship between single and multiple habitat metric values was often unpredictable and highly variable. The influence of abiotic factors on these relationships was examined to determine conditions under which the two methods collected similar samples. Although this work was reviewed by EPA and approved for publication, it may not necessarily reflect official Agency policy.